

## TITLE: SCREW HEAD PUNCH

### BACKGROUND OF THE INVENTION

#### (a) Technical Field of the Invention

The present invention is related to a punch for screw head, and more  
5 particularly, to one that extends service life of the punch and upgrades quality  
of the screw.

#### (b) Description of the Prior Art

A screw, though a small element among all hardware products, is a must  
for the assembly of various types of objects. To facilitate driving a screw, the  
10 on the surface of the head of the screw is usually provided with a socket either  
in flat, cross or square shape. To prevent the socket from restricting the use  
of the tool, e.g., a screwdriver, the socket is made in a shape combining two or  
more than two of the head shapes. In the formation of the socket, a punch is  
used to punch into the surface of the screw head when the screw is molded.  
15 Each punch is subject to more than two hundred rounds of punching the  
socket; therefore, a very high punching force is created in the punching  
process. Generally, in punching for the flat socket, the over concentration of  
stress at a certain point is less likely to happen giving longer service life of the  
punch and better quality of the processed socket. However, in the punching  
20 for comparatively complicated form of socket, e.g., cross, square, polygonal or

their combinations, the concentration of stress at certain point occurs resulting in bouncing of punch force back to the punch or direct application of the force on the screw head during the punching process. Accordingly, the head of the punch is damaged in short time, the socket is deformed or cracks appear on  
5 the corner of the socket. A punch 1 of the prior art designated for punching a square socket as illustrated in the accompanying drawings is provided with a recess 12 on one end of the body and a punch head 13 formed at the center of the recess 12. The end of the punch head relates to a conic extending gradually from four corners toward its center so to punch against the head of a  
10 screw for a square socket. However, the structure of the punch 1 has served its purpose to punch for a square socket on the head of the screw, the over-concentrated stress results in that the damaged punch to cause extra cost of punching; that the square socket is deformed to cause the failure in a sound insertion between the head of the screw and the tool (e.g. a screwdriver) thus  
15 to affect the fastening; or that cracks appear on the four corners of the square socket to cause collapse when the square socket is driven by the screwdriver thus to prevent the fastening. No effective solution has been suggested for any of the flaws as described herein.

## SUMMARY OF THE INVENTION

The primary purpose of the present invention is to provide an improved structure of a punch for the head of a screw to extend the service life of the punch and upgrade the quality of the screw. To achieve the purpose, wings  
5 are provided on the sides of the punch head at a level lower than that of the punch head so that when the punch is used to punch for a socket on the head of the screw, a flute slightly recessed will be formed on the sides of the socket to serve as a point for releasing the pressure incurred from the punching process, thus to prevent deformed socket or creation of stress concentration  
10 point on the corner of the socket.

The foregoing object and summary provide only a brief introduction to the present invention. To fully appreciate these and other objects of the present invention as well as the invention itself, all of which will become apparent to those skilled in the art, the following detailed description of the  
15 invention and the claims should be read in conjunction with the accompanying drawings. Throughout the specification and drawings identical reference numerals refer to identical or similar parts.

Many other advantages and features of the present invention will become manifest to those versed in the art upon making reference to the detailed  
20 description and the accompanying sheets of drawings in which a preferred

structural embodiment incorporating the principles of the present invention is shown by way of illustrative example.

## BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a perspective view of the prior art.

Fig. 2 is a perspective view of a preferred embodiment of the present invention.

5        Fig. 3 is a perspective view of a screw with its head processed by a punch of the preferred embodiment.

Fig. 4 is a perspective view of another preferred embodiment of the present invention.

10       Fig. 5 is a perspective view of another preferred embodiment yet of the present invention.

Fig. 6 is a perspective view of another preferred embodiment yet of the present invention.

## DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The following descriptions are of exemplary embodiments only, and are not intended to limit the scope, applicability or configuration of the invention in any way. Rather, the following description provides a convenient

5 illustration for implementing exemplary embodiments of the invention.

Various changes to the described embodiments may be made in the function and arrangement of the elements described without departing from the scope of the invention as set forth in the appended claims.

Referring to Fig. 2, the basic configuration of a punch 2 of the present  
10 invention is the same as that of the prior art by having a recess 22 formed on an end 22 of a body 21 of the punch 2; and a punch head 23 protrudes from the center of the recess 22 and is made in square with its end gradually extending toward the center from four corners to form a conic. In the present invention, four wings 24 are each respectively extended from four sides of the  
15 punch head 23 at a level lower than that of the punch head 23.

When the punch head 23 is used punch against a screw head 3 for a square socket 31 as illustrated in Fig. 3, those wings 24 also punch against the end of the screw head 3. However, since those wings 24 are provided at a level lower than that of the punch head 23, only a punch trace 32 slightly  
20 recessed will be created respectively on four sides of the socket 31 without

causing destruction to the strength of the square socket 31. Therefore, corners of the square socket 31 will not collapse when the screw is driven.

The formation of the punching trace 32 serves a point to release the punching pressure created in the punching process of the punch 2. Accordingly, the  
5 pressure will not bounce back to the punch head 23, and four corners of the square socket will not become the point of stress concentration. Without the pressure to bounce back to the punch head 23, the punch head will not be damaged thus to extend the service life of the punch 2 and lower the punching cost. The absence of concentration of stress on the square socket 31 prevents  
10 cracks to develop on four corners of the square socket 31. Furthermore, the absence of cracks prevents collapse of the screw while the screw is driven, thus to upgrade the quality of the screw.

As illustrated in Fig. 4, the present invention is applicable for punching two overlapped square sockets with eight corners of both square sockets  
15 alternatively arranged from one another. A punch 4 with a punch head 41 of the present invention has multiple wings 42 extended from where two square punch heads 41A and 41B meet at a level lower than that of the punch head 41. Alternatively as illustrated in Fig. 5, a punch 5 with a punch head 51 of the present invention to punch a mixed socket of square and cross forms has  
20 multiple wings 52 extended from four sides of the square punch head 51; or as

illustrated in Fig. 6, a punch 6 with a punch head 61 of the present invention to punch a mixed socket of square, cross and flat forms has extended from four sides of a square punch head 61A multiple wings 62 at a level lower than that of the punch head 61A. In all the preferred embodiments described above,  
5 those multiple wings 42, 52 or 62 are used to create punch traces to serve the points for releasing punching pressure when the punch 4, 5 or 6 is used to punch for a socket on the head of the screw to achieve the same purposes of extending service life of the punch and upgrading the quality of the screw.

It will be understood that each of the elements described above, or two or  
10 more together may also find a useful application in other types of methods differing from the type described above.

While certain novel features of this invention have been shown and described and are pointed out in the annexed claim, it is not intended to be limited to the details above, since it will be understood that various omissions,  
15 modifications, substitutions and changes in the forms and details of the device illustrated and in its operation can be made by those skilled in the art without departing in any way from the spirit of the present invention.